

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

The fabrication and application of nanoSQUIDs LEI CHEN, HAO WANG, XIAOYU LIU, LONG WU, ZHEN WANG, SIMIT CAS — NanoSQUIDs with nano-bridge junctions can be miniaturized into the nano-scale to measure a single Bohr magneton. Recently, the Pb-SOT nanoSQUID achieved the spin sensitivity comparable to the magnet-tipped ultra-soft cantilever in MRFM. Therefore, it is possible to use a nanoSQUID as a spin sensor for the on-chip nanoMRI integration. However, the performance of Nb planar nanoSQUIDs are limited by the shallow flux modulation depth. Here, we are presenting the research progress made 3D nanoSQUID at SIMIT. The 3D Nb nanoSQUID shows a above 60% flux modulation depth and a reversible current-voltage curve. The working field range and flux noise of the Nb nanoSQUID is 0.5 T and $0.34 \mu\Phi_0\sqrt{\text{Hz}}$. Also, we used the nanoSQUID to measure the Meissner effect of a single indium particle (of 47 μm in diameter) and niobium particle (of 25 μm in diameter). The nanoSQUID measurement allowed us to observed a sharp Meissner effect transition of the small superconductors which were greatly broadened in the commercial MPMS.

Lei Chen
SIMIT CAS

Date submitted: 12 Nov 2016

Electronic form version 1.4